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Pietrek, Hartmut

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Hydrographic applications on a Mac

Public domain software solutions

An article by HARTMUT PIETREK

Since the introduction of iPhone and iPad, Apple products have been in wider use. But – in spite of the huge choice of apps – there is no program yet that can be used for applications in hydrography. With a little effort and some additional software, public

domain software such as GMT, MB-System or Quantum GIS can be made to run under the Apple operating system.

Apple Mac OS X | MB-System | Quantum GIS | Fink | X Window | XQuartz | Xcode | Command Line Tool – CLT

1 Introduction

More and more public domain software can be used for applications in hydrography and cartography. However, this software is rarely written for Apple computers. Besides, the standard installation of the Apple operating system is not set up for an installation of public domain software without obstacles. To enable the Mac user to make use of this software, a couple of prerequisites have to be fulfilled. This given, the Mac world can enjoy the benefits of MB-System and Quantum GIS (Fig. 1). MB-System puts almost all tools at your hand that are required for processing multibeam echo sounder data. Quantum GIS can be employed to bring the results into an appropriate context.

2 Creating the prerequisites

In order to be able to install public domain software, first of all the Apple Xcode package has to be available. In addition, the software package MB-System requires the X Window libraries. In order to compile the software code, the Command Line Tool (CLT) is required as an add-on component to the Xcode package.

Furthermore, Fink is needed. This package manager takes care that all relevant packages are downloaded and installed on their proper locations.

All packages should be installed together in a designated directory, e.g. under `/Users/$USERNAME/Downloads/fink-install`, where `$USERNAME` is the name of the account on the computer in use.

2.1 Installation of Xcode and CLT

Xcode is a complete development environment with everything that is needed for application development under Mac OS X. This package is available without charge at: <https://itunes.apple.com/en/app/xcode/id497799835?mt=12>.

Upon installation, Xcode should be started in order to post-install the Command Line Tool (CLT). The easiest way to accomplish this is to select Xcode in the Menu Bar and then *Preferences* ... Select the index-tab *Downloads* in the dialogue window that opens up. On the tab select the entry »Command Line Tools«. These are then loaded

and installed automatically. Finally, the C compiler is required which is invoked by the command `cc`. It is included in the Xcode package and can be found in the directory `/usr/bin`.

2.2 Installation of X Window libraries

With XQuartz the X and Open Motif libraries are meant that are provided by Apple within the Open Source Project. These libraries are required for the interactive program parts of MB-System and other public domain software. The X Window libraries are available under <http://xquartz.macosforge.org/landing/>. The file XQuartz-2.7.7.dmg is installed by double-clicking.

2.3 Installation of Fink

The package manager Fink can be obtained at www.finkproject.org/download/srcdist.php.

After downloading, Fink is available as zipped (gz) and archived (tar) file: `fink-0.38.3.tar.gz`.

First this file has to be unzipped. Thereafter a new directory exists with the name `fink-0.38.3` containing various files and subdirectories.

In the next step the program Bootstrap has to be run that is located in the directory just created previously. It may happen that this program does not start or that an error message appears saying

Author

Hartmut Pietrek is a staff member of the Hydrographic Surveying Division at the Federal Maritime and Hydrographic Agency in Hamburg

info@piconsult.org

Fig. 1: Everything that is necessary to run hydrographic applications like MB-System or Quantum GIS on a Mac



Useful links**Fink**

http://pdb.finkproject.org/pdb/package.php/mbsystem?rel_id=10.8-x86_64-current-stable

MB-System

www.ldeo.columbia.edu/res/pi/MB-System/

Quantum GIS

www.kyngchaos.com/software/qgis

GMT

[ftp://ftp.geog.uit.no/pub/gmt/](http://ftp.geog.uit.no/pub/gmt/)

OSU tidal software

<http://volkov.oce.orst.edu/tides/>

that it cannot be executed because it is not certified. In this case, the program has to be marked and opened from the context menu, selecting *Open with ...* and then *Terminal*. Upon this, a question appears asking whether the program should be opened. This is confirmed by *Open*. Thereafter the program Terminal starts. Immediately after starting, a window appears prompting for selection of a method. Then a »1« has to be entered and the Return key pressed in order to accept the program's suggestion. Subsequently the password of the root user has to be entered. The program will continue its starting process and make some statements that are recorded rather extensively. Then it will ask for the path where to install Fink. Accept the preset directory path /sw by pressing the Return key. Then Fink will start running. This process takes some time while various states of the system proper are checked, and the relevant files and directories are created as they will be used by Fink for its operation.

3 Installation of hydrography software

Having installed Xcode, CLT, X Window, and Fink, the prerequisites have been established for downloading various software packages from the Fink website.

First the Terminal is required that is located in the folder containing utility programs. Thereafter the package manager Fink should be updated. Typing /sw/bin/fink will start the script.

Subsequently, Fink should be updated to the most recent version with <Option> <Command>,

for a typical Unix command. A blank character has to be placed between individual options and commands. The options can either be written in full length (with two preceding minus signs) or abbreviated (with only one preceding minus sign).

The Fink call for updates uses `--verbose selfupdate`. With this, a Fink update takes place that displays all commands and feedback messages, taking several minutes.

3.1 Installation of MB-System

MB-System is an Open Source software for processing and displaying bathymetric data. Raw data formats of multibeam echo sounders can be processed directly, a property that permits the use of original data, even after several years.

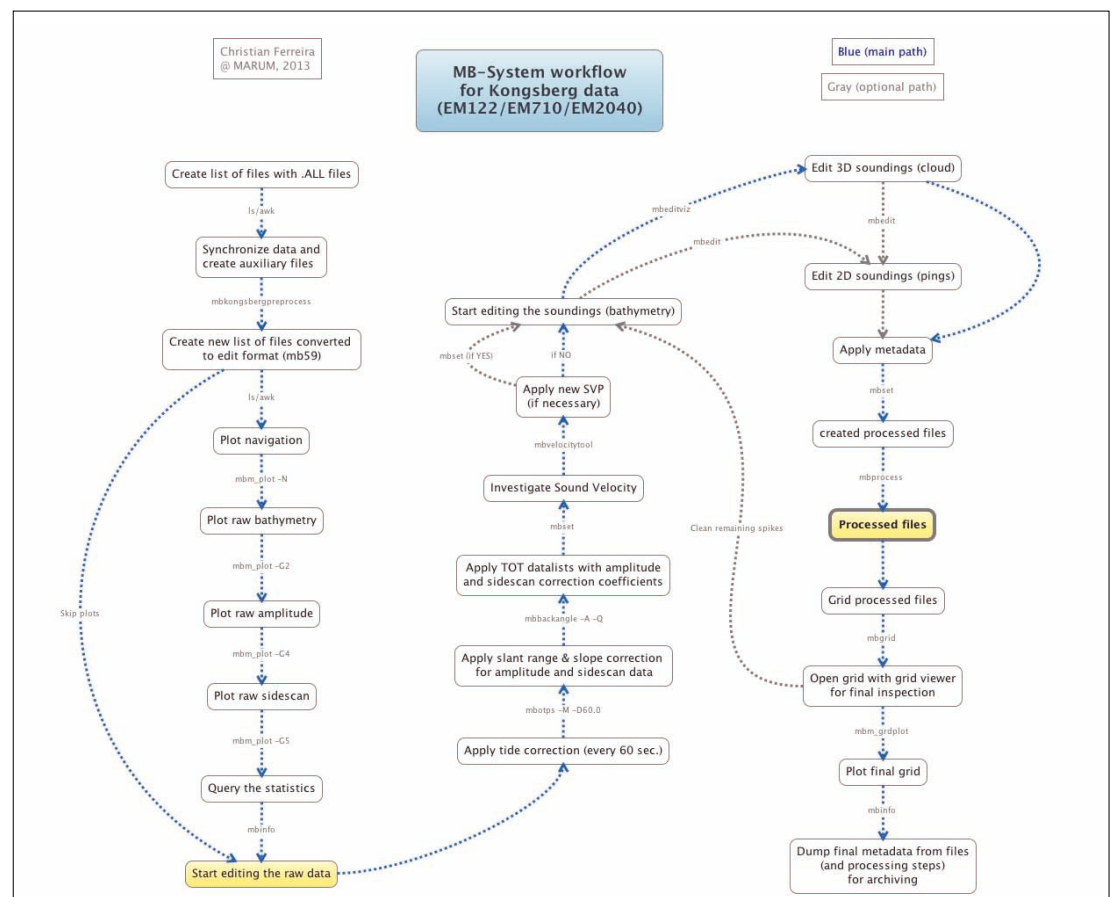
It makes sense to look for the package to be installed on the Fink website www.finkproject.org.

In the area *Sections*, first select *Packages* and then *By Package*. Enter the keyword »mbsystem« in the field *Package Name* of the search mask, and start the search which, in turn, will output two results:

- mbsystem
- mbsystem-dev

Both packages carry the same version number. The package with -dev in its name is the developer version with additional components. It is recommended to select the entry mbsystem. Then an overview page appears showing the package history. For the most recent versions of OS X, there is a »stable« version. Now the essential corner points of the package are known, and the next step is to return to the installation, i.e. to Terminal.

Fig. 2: A proven workflow for the processing of multibeam echo sounder data with MB-System



The command to install MB-System is:
`fink -v install mbsystem.`

The installation takes some time. With the option `-v` it is well possible to check if the installation is still continuing or if and where an error occurred. A successful installation is indicated as the system prompt reappears.

In order to verify that the programs work correctly, the X11 environment (XQuartz) can be launched. XQuartz can be found among the utility programs.

As soon as XQuartz has been started, inspect the main menu X11 and select *Programs* and thereafter *xterm*, whereupon an xterm window is opened.

Here, the command `/sw/bin/mbedit` has to be entered, leading to the display of an X11 window.

Select *About* in the main menu. A window with the version information of MB-System is displayed. Who is able to view this window has done everything right, as far as the installation is concerned, and can start processing multibeam echo sounder data (Fig. 2).

3.2 Installation of Quantum GIS

Quantum GIS – also denoted as QGIS – meets nearly all requirements for a geographic information system (GIS). Several public domain database systems are supported, including PostGIS and

SQLite, as well as one or the other commercial database management system. Some properties, such as unrestricted support of the GeoDataBase (GDB) are still missing, but there are workarounds in order to remove or neutralise such deficiencies. QGIS can be obtained from www.kyngchaos.com/software/qgis.

QGIS requires some additional libraries that are contained in the GDAL complete 1.10 framework package. This package contains the PROJ library (Cartographic Projections Library), the UnixImageIO library (for processing various image data formats), the GEOS (Geometry Engine Open Source) package with the add-ons of the R-GeoS package, as well as the embedded database system SQLite as framework together with the Spatialite Tools.

First the GDAL package has to be installed; subsequently Quantum GIS. Starting with Version 2.0, the QGIS package also contains the GRASS Toolbox, as well as SAGA-GIS, the ORFEO Toolbox, and also the TauDEM-package (Terrain analysis using Digital Elevation Models). Since then the possibility is also offered to check the installation. At any rate, it pays to start each package for a short while in order to see the program logo appearing. Who can view the logo has done everything right in the installation process. ⚓

Hint

This solution was tested successfully under Mac OS X 10.8 (Mountain Lion). Validated solutions are not yet available for more recent versions of this operating system

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marketing@bremenports.de
www.bremenports.de/en